

HOLLOW BAR – HB 470 AR

HB 470 AR Carbon – Manganese – Vanadium micro - alloyed steel, supplied cold drawn or black as rolled with a tensile strength range of 600 – 750 MPa, plus high yield strength, offering a good combination of strength and toughness, with excellent machinability and weldability.

Typical Applications:

Tubular parts such as hollow rolls for conveyors, hydraulic cylinders, rings, bushes, hollow shafts and nuts etc.

Dimensions and Tolerances:

Hollow bar sizes are guaranteed clean up dimensions after machining - chucking on OD. Guarantee applies over 200mm maximum length only.

Lengths:

Random 4000 - 5500mm or
Random 5000 - 6500mm

Mechanical Properties - (Minimum at room temperature)

Wall Thickness	Rp 0.2 (MPa)	Rm (MPa)	A %
≤ 16mm	470	650	17
>16mm ≤ 40mm	430	600	17

Typical Mechanical Properties – As supplied – for guidance only

Yield Strength MPa	Tensile strength MPa	Elongation %	Hardness HB
490	695	20	205

Chemical Composition (wt %)

Carbon	0.16 / 0.22
Silicon	0.10 / 0.50
Manganese	1.30 / 1.70
Vanadium	0.08 / 0.15
Phosphorus	≤ 0.030
Sulphur	≤ 0.035
Aluminium	≤ 0.010
Niobium	≤ 0.070
Titanium	≤ 0.020

Related Specifications:

EN 10294-1	Grade E470
Werkstoff	1.5217 20MnV 6

Machinability:

Excellent machinability with high cutting speeds or improved tool life

Heat Treatment:

Will through harden with a moderate increase in strength and will also carburise, carbonitride or nitride

Typical (minimum) mechanical properties – Quenched and tempered

WT	Yield Strength MPa	Tensile Strength MPa	Elong %	Charpy J	Hardness HB
≤ 16	590	700	16	40	205
≤ 25	540	570	16	40	160
≤ 50	480	570	16	-	160

Typical mechanical properties for guidance only

Welding:

Excellent weldability hot rolled or cold drawn but avoid when through hardened or surface hardened. Welding details for guidance only

Welding procedure:

Pre-heat: 100 – 120°C ≤ 16mm WT
200 – 250°C > 16mm WT
Post-weld stress-relieve 600–620°C
(Guaranteed Ave. Ceq ≤ 0.57)

HEAT TREATMENT
Normalising:

Heat to 880°C Cool in still air

Stress Relieving:

Heat to 600 – 620°C Cool in still air

Hardening:

Heat to 880°C Quench in oil or water

Tempering:

Heat to 500 – 600°C (or as required)
Cool in still air

Nitriding:

Heat to 490°C – 530°C
Hold till case depth developed
Typical case **HRC 55**

Carburising:

Carburise at 880°C – 920°C

Core Refining: (Optional)

Oil quench at 870°C – 880°C

Case Hardening:

Water quench at 760°C – 780°C
Temper at 150°C – 200°C.
Typical case **HRC 60**

Carbonitriding:

Carbonitride at 870°C – 880°C
Quench in oil or water.
Temper at 150°C – 200°C.
Typical case **HRC 60**

Heat treatment details for guidance only